California Energy Commission

June 8, 2004

Testimony to be Included in the Workshop on

Renewable Distributed Generation

Stephen Heckeroth
P.O. Box 151
Albion, CA 95410
steve@renewables.com

The Governor's Pledge

"California's energy crisis is not over. If we do not act now, California will face energy shortages as early as 2006.

I'm going to encourage builders to build homes using partial solar power.

I intend to show the world that economic growth and the environment can coexist."

The California Residential Solar Initiative

“By 2005, 50% of new housing developments would install solar PV.”

70,000 PV roofs have been installed in Japan and over 500 megawatts have been installed in Germany

6 kilowatts of *UNI-SOLAR* integrated photovoltaic roofing Installed on a cohousing project in California

California's Renewable Energy Standard

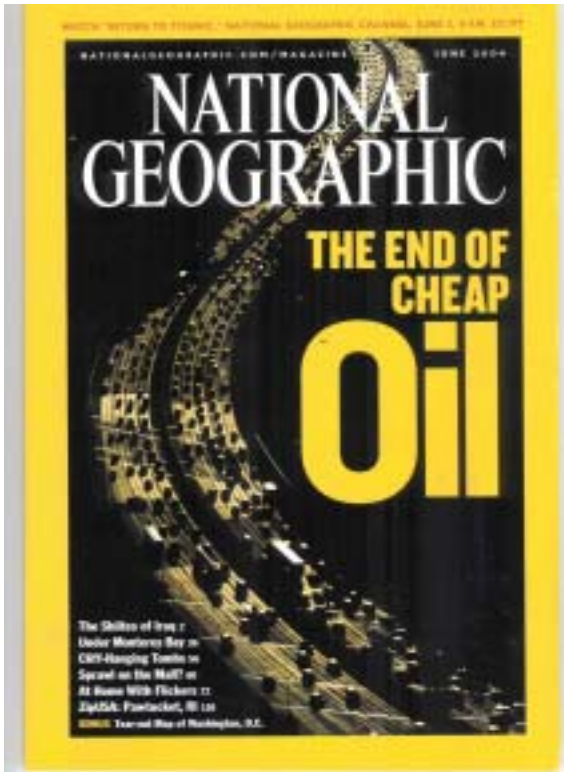
"Derive 33% of the state's power from renewable sources by 2020."

SIT/ *UNI-SOLAR* 230 kW Installation in Los Angeles, CA

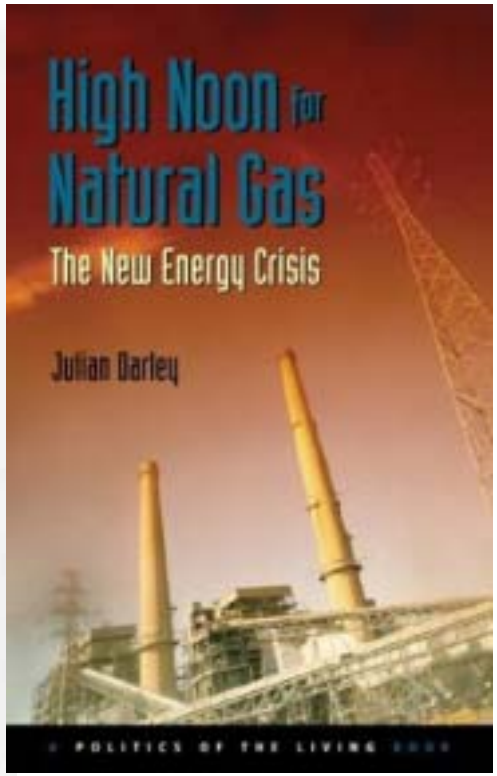
Why Renewables?

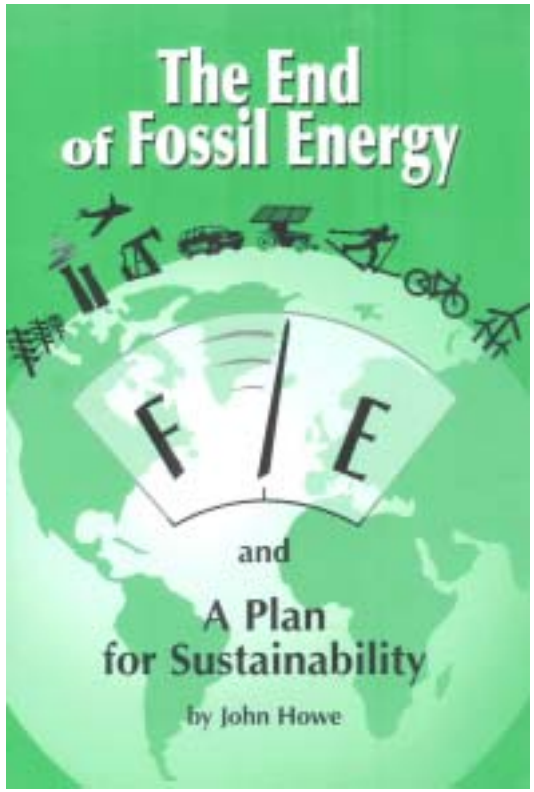
Suggested Reading

Natural gas which provides 45% of CA electricity is also in short supply



Mainstream confirmation of the end of cheap oil

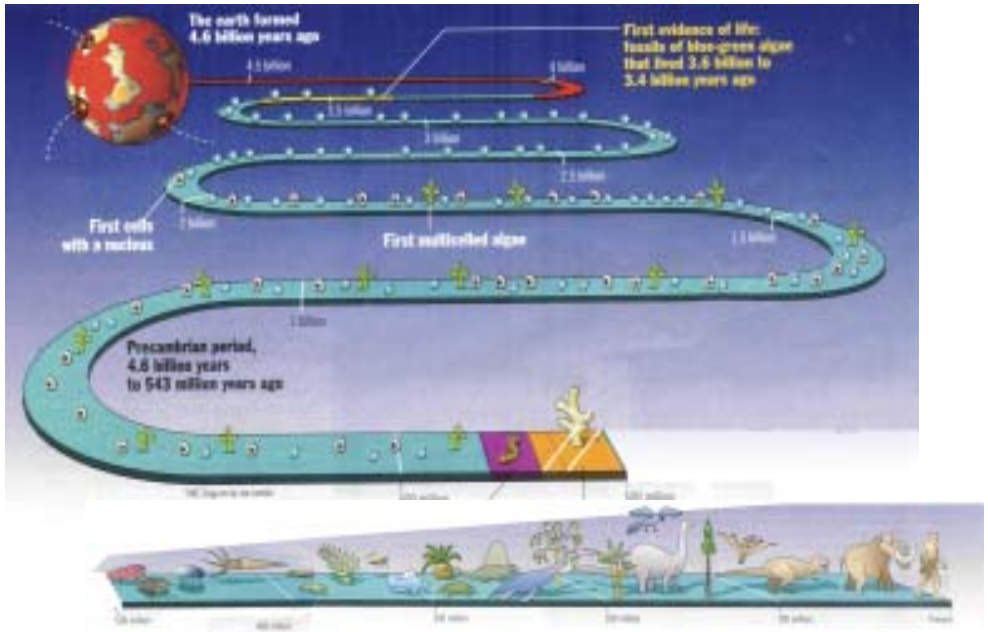




This book suggests that the best solution for future electricity shortages is PV on every roof

Scarcity

It took 3.5 billion years of sunlight and plant growth to create the Earth's oxygen rich atmosphere and fossil fuel resource



We are consuming the precious legacy of finite resources in the blink of an eye in geologic time and leaving a depleted and polluted planet for our children

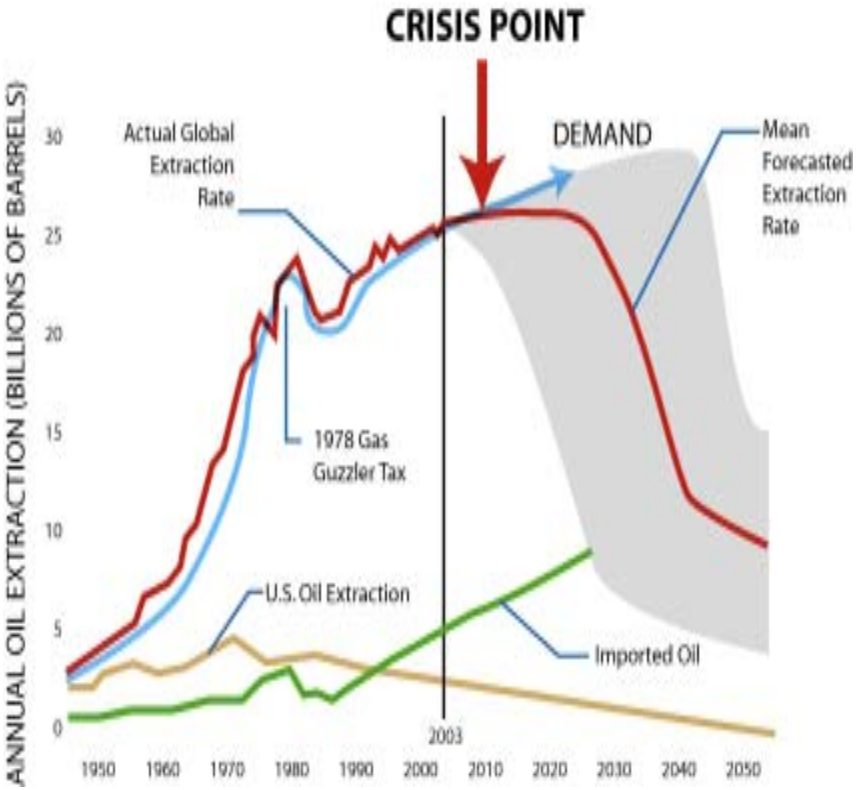
Abundance

The Sun will burn for another 5.5 billion years

Every hour, the sun showers the earth with more power than human beings consume in an entire year. There is enough roof area with Solar exposure to satisfy all our electricity needs.

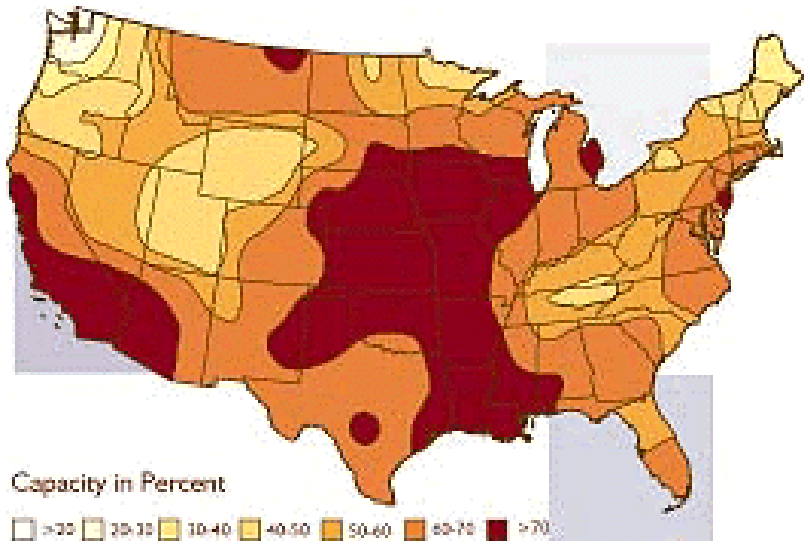
Energy Independence & Security

US oil and gas production peaked in 1970



Californians pay $80 Billion/year to other States and Countries for 80% of the fuel we burn.

California is the Middle East of Solar Power



PV ELCC map of U.S. (based on 500 utility loads)

Every hour, the sun showers the earth with more power than human beings consume in an entire year.

Why Distributed Generation?

- Ugly infrastructure
- Polluted air
- Extraction site devastation
- Polluted land
- Spills and polluted water
- Energy resource wars

Fossil fuels

- PV roofing
- Clean air
- No extraction sites
- Healthy land
- No water pollution
- No resource wars

BIPV

Centralized Power Generation

- Uses valuable land
- Requires long permitting process
- Takes a long time to build
- Has high-security costs
- Has high construction costs
- Requires dedicated transmission and distribution lines
- Transmission and distribution lines use valuable land
- Requires connections to other power generating facilities
- Requires transformers and switching gear
- High reclamation costs after useful life
- Increases load on distribution and transmission lines
- Produces power valued at low WHOLESALE rate

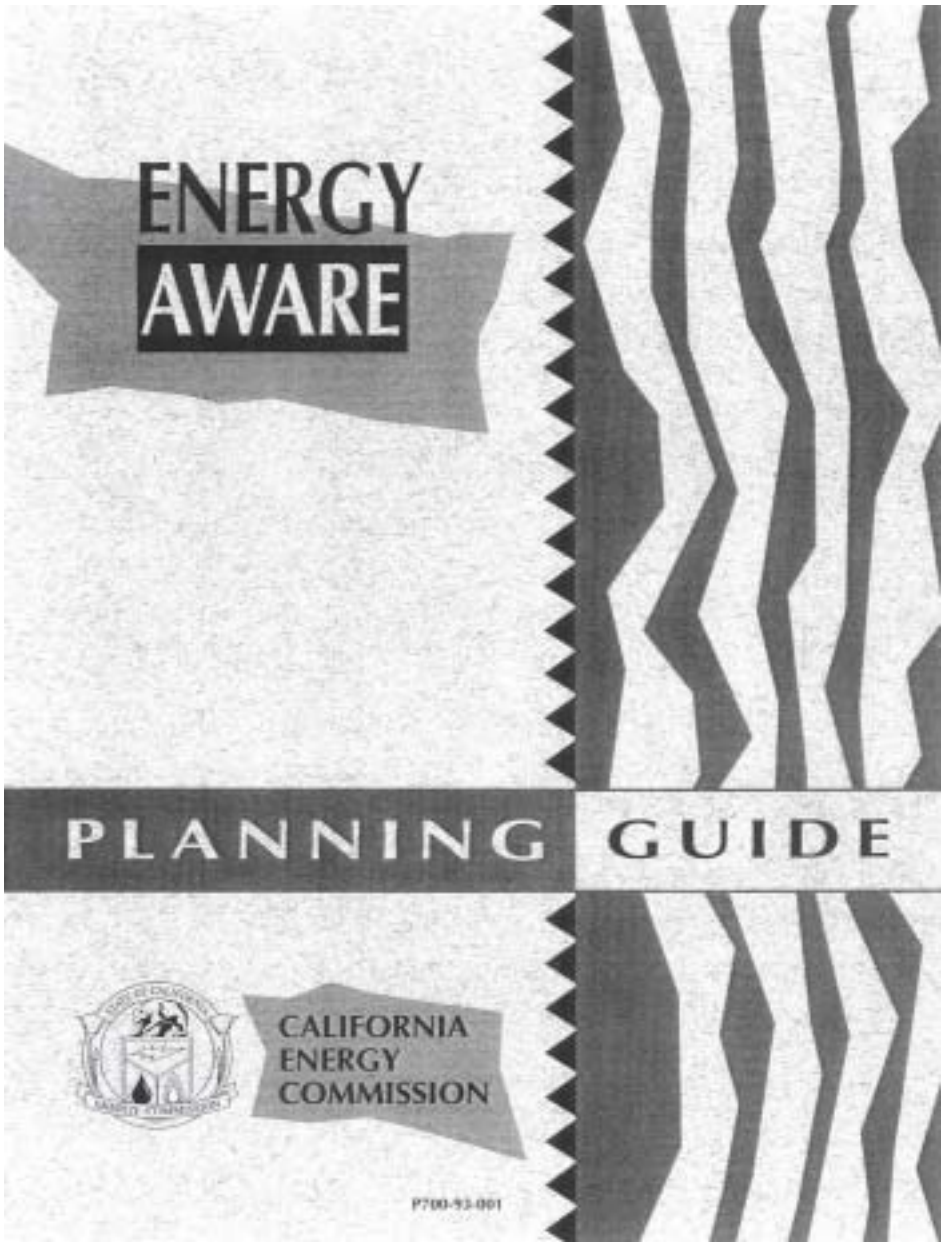
Distributed Power Generation

- **Requires no additional land**
- **Requires no additional permitting time**
- **Requires no additional distribution lines**
- **Serves the duel function of roofing and power generator**
- **Needs no added security**
- **Has minimal impact on transmission and distribution infrastructure**
- **Produces power valued at high RETAIL rate and can be time of use (TOU) Net-Metered for Peak Power Shaving**

Achieving Energy Independence with Zero Energy Homes

Land Use, Orientation, Efficiency and Conservation first, then PV

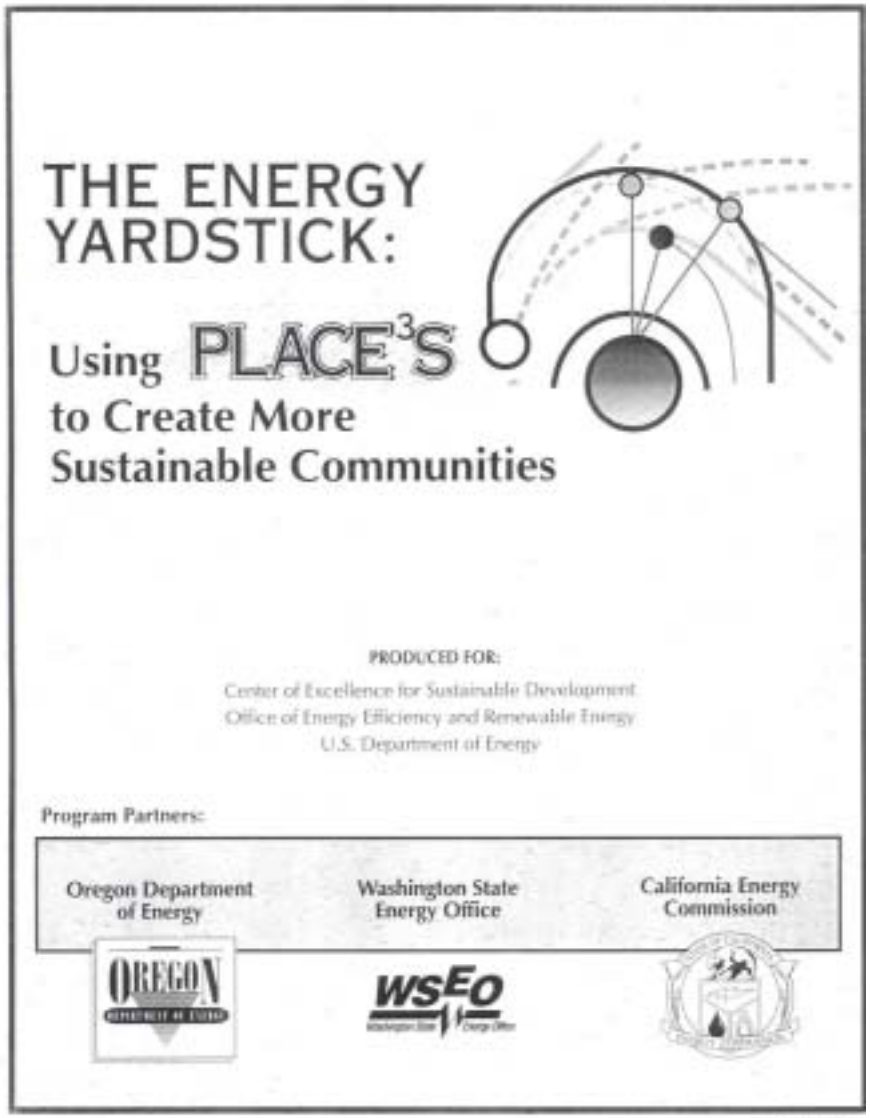
Energy Aware Published by the CEC in 1994



Planning strategies:

1. Mixed use development
2. Density near transit
3. Street trees
4. Pedestrian facilities
5. Bicycle facilities
6. Telecommuting
7. Fleet efficiency

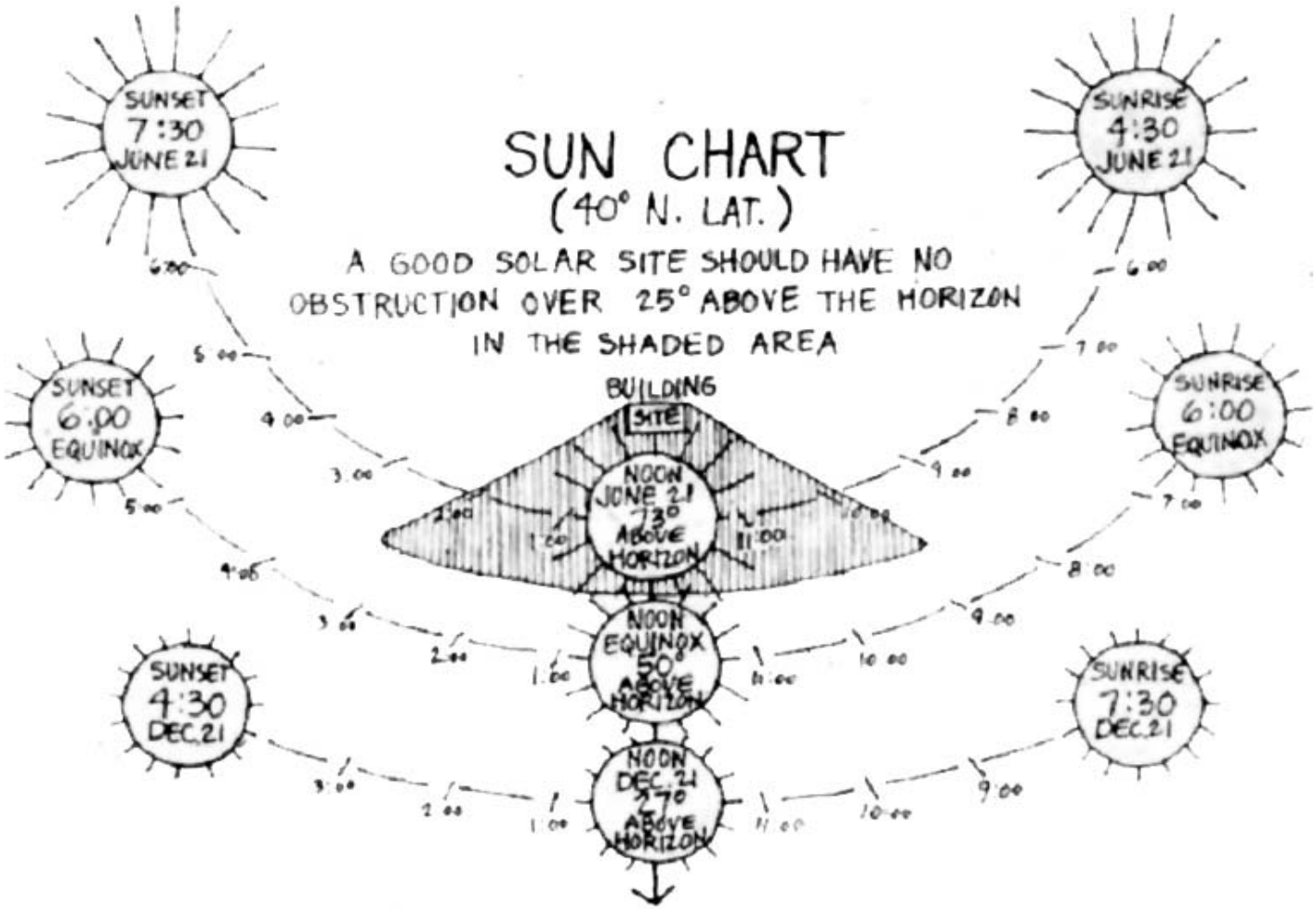
Planning for **C**ommunity **E**nergy, **E**conomic and **E**nvironmental **S**ustainability, 1996



Using energy as a yardstick to measure and compare the efficiency of development options so that informed decisions can be made.

Recent development in GPS and GIS make this strategy an inexpensive planning tool.

You have to know where the sun is in order to use its energy



Lessons Learned

- We have to learn from the failure of the solar water heating incentives of the late seventies and early eighties
- We should have renewable revolving loan programs and performance-based incentives.